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Journal of the Society of Arts.

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# PRODUCTION OF ORGANIC BODIES WITHOUT THE AGENCY OF VITALITY.

The following is an abstract of a lecture delivered at the Royal Institution, by Professor E. Frankland, F.R.S., F.C.S.:—

The earliest researches of chemists brought them into contact with two classes of bodies, distinguished from each other by well-marked and obvious peculiarities. One of them was met with in the inanimate or mineral kingdom, the various materials of which were distinguished by their comparative stability or resistance to change, and by the facility with which the greater number of them could be artificially produced from the elementary bodies composing them. The other class of bodies was found exclusively in the animal portion of creation, or was directly derived from the productions of the organs of plants and of animals: these compounds were distinguished by their proneness to undergo change, and by the impossibility of producing them by artificial means. By no process then known to chemists, could the elements composing these latter bodies be made to unite, so as to produce compounds, either identical with, or analogous to, the substances generated by the organs of plants and of animals. These substances were consequently, from their origin, termed organic bodies or organic compounds. They were regarded as dependent for their origin upon the influence of that aggregate of conditions sometimes called vital force; and it was generally believed, that we should never succeed in producing these bodies artificially, until we could form and endow with vitality the organs from which they were derived.

Such was the state of knowledge and opinion until the year 1828, when Wöhler succeeded in artificially producing urea, a body which had up to that time been known as a product of the animal organism.* This discovery was followed many years later by the artificial formation of acetic acid, which was produced by Kolbe from a mixture of protocholoride of carbon, water, and chlorine exposed to sunlight, the chloracetic acid thus obtained being afterwards converted into acetic acid by an amalgam of potassium. The subsequent production of methyl by the same chemist from acetic acid, added one of the organic radicals to the list of compounds producible from their elements. Although little further progress was made for several years in this department of chemical research, yet the artificial production of urea and acetic acid, together with their derivatives, completely broke down the barrier between so-called "organic" and "in-organic" bodies; and although the name "organic" was still retained for the class of bodies to which it had previously been assigned, it was now obviously no longer strictly applicable.

The recent ingenious researches of M. Berthelot have greatly extended this branch of chemical inquiry, and have in a most important degree increased the number of bodies capable of artificial formation. The production of chloride of methyl and the members of the olefiant gas family up to amylene ($C_{10} H_{10}$), furnish us with the whole series of alcohols and their derivatives, from amylic alcohol downwards. Phenylic alcohol and naphthaline, both artificially produced by Berthelot, yield a host of interesting bodies; whilst phenylcarbamic acid enables us to step from the phenylic to the salicylic group, since, when treated with hyponitrous acid, it yields salicylic acid. Lastly, M. Berthelot has succeeded in artificially forming glycerine, the basis of animal and vegetable oils and fats, and also in forming grape sugar; the latter however is obtained by the contact of glycerine with putrifying animal matter, and consequently cannot be said to be produced altogether without the agency of vitality; although the putrifying organic matter contributes none of its constituents to the new compound, and does not undergo any appreciable change in weight or appearance during the process. These substances yield such a numerous class of derivatives, that upwards of 700 distinct organic compounds can now be produced from their elements without the agency of vitality.

The processes employed for the artificial production of these bodies, though deeply interesting, present, with one or two exceptions, little or no analogy to the natural mode by which organic compounds are formed in the tissues of plants; but the speaker endeavoured to show, that a close attention to the nature of the inorganic materials assimilated by the vegetable kingdom, and their relations to the more important organic compounds derived from plants, leads to the belief that such compounds can be successfully produced by processes strictly analogous to those employed by nature. He contended that the constitution of the so-called organo-metallic bodies, in which the production of complex organic compounds from inorganic ones by the replacement of elements by organic groups can be so clearly traced, afforded a valuable clue to the formation of organic bodies in general, and led directly to the conclusion, that if the organic compounds of the metals be formed upon the model of the oxides of the respective metals, the organic compounds of carbon (that is, all organic compounds) are formed upon the model of the oxides of carbon.

It has long been known, that with slight and unimportant exceptions, the only materials employed by nature in the construction of the most complex organic compounds, are carbonic acid, water, ammonia, and nitric acid. The fact that a vast number of organic compounds are cast in the molecular mould of water, has been proved by the ingenious researches of Williamson and Gerhardt; whilst the wonderful fertility of the ammonia model has been amply demonstrated by the labours of Hofmann and Wurtz. It would also not be difficult to prove the claim of nitric acid to be considered as a third model upon which a number of other organic compounds are built up; but it was necessary to confine attention on the present occasion to the consideration of carbonic acid only, as a model upon which a very large number of organic bodies are formed.

Guided by the constitution above referred to of the organo-metallic bodies, and bearing in mind the replacibility of the oxygen in water and binoxide of nitrogen, and the chlorine in terchloride of phosphorus, by organic radicals, Professor Kolbe and the speaker were led to the following hypothesis regarding the constitution of several important classes of organic compounds.

1. The replacement of one atom of oxygen in carbonic acid by hydrogen or its homologues, produces an organic acid, either of the fatty or of the aromatic series, thus:—

$$\begin{array}{ccc}
\text{Carbonic Acid.} & \text{Acetic Acid.} & \text{Benzoic Acid.} \\
C_2 \left\{ \begin{array}{c} O \\ O \\ O \\ O \end{array} \right. &
C_2 \left\{ \begin{array}{c} (C_2 H_3) \\ O \\ O \\ O \end{array} \right. &
C_2 \left\{ \begin{array}{c} (C_{12} H_5 \\ O \\ O \\ O \end{array} \right.
\end{array}$$

2. The like replacement of two atoms of oxygen in carbonic acid, produces either an acetone, or an aldehyde, thus:—

$$\begin{array}{cccc}
\text{Carbonic Acid.} & \text{Acetone.} & \text{Aldehyde.} & \text{Oil of Bitter Almonds} \\
C_2 \left\{ \begin{array}{c} O \\ O \\ O \\ O \end{array} \right. &
C_2 \left\{ \begin{array}{c} (C_2 H_3) \\ (C_2 H_3) \\ O \\ O \end{array} \right. &
C_2 \left\{ \begin{array}{c} C_2 H_3 \\ H \\ O \\ O \end{array} \right. &
C_2 \left\{ \begin{array}{c} C_{12} H_5. \\ H \\ O \\ O \end{array} \right.
\end{array}$$

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* **The artificial formation of urea from cyanate of ammonia was exhibited under the influence of polarised electric light.**

3. The like replacement of three atoms of oxygen in carbonic acid, produces an ether, thus:—

$$\underset{\text{Carbonic Acid.}}{C_2\left\{\begin{array}{l}O\\O\\O\\O\end{array}\right.}\qquad\qquad \underset{\text{Vinic Ethor.}}{C_2\left\{\begin{array}{c}C_2\,H_3\\H\\H\\O\end{array}\right.}$$

4. The like replacement of all the atoms of oxygen in carbonic acid, produces a radical, a hydride of a radical, or a double radical, thus:—

$$\underset{\text{Carbonic Acid.}}{C_2\left\{\begin{array}{l}O\\O\\O\\O\end{array}\right.}\qquad \underset{\text{Ethyl.}}{C^2\left\{\begin{array}{c}C_2\,H_3\\H\\H\\C_4\,H_5\end{array}\right.}\qquad \underset{\text{Hydride of Methyl. (Fire damp.)}}{C_2\left\{\begin{array}{l}H\\H\\H\\H\end{array}\right.}\qquad \underset{\text{Methyl-ethyl.}}{C_2\left\{\begin{array}{c}C_2\,H_3\\H\\H\\C_2\,H_3\end{array}\right.}$$

The authors of this hypothesis now attempted to verify it by direct experiment. They endeavoured to avail themselves of the powerful affinities of zincethyl, in order to effect the substitution of oxygen in carbonic acid, and sulphur in bisulphide of carbon, by ethyl; these attempts were, however, at best only partially successful; the re-agent, the zincethyl, was not sufficiently powerful to rival the action of plants in the decomposition of carbonic acid; and its effects upon bisulphide of carbon resulted in the production of a number of organic bodies containing sulphur; and although one of these appeared to have the formula of sulphopropionic acid ($C_6\,H_5\,S_3 + H\,S$), yet its complete separation and purification presented such difficulties, that it would have been hazardous to rely upon it as a proof of the correctness of their hypothesis. In short, the verification of these views was not permitted to their authors, but was reserved for Mr. Wanklyn, who, in his newly-discovered sodium and potassium compounds of the organic radicals, came into possession of re-agents which enabled him at once to effect the desired substitutions. His memoir on the production of propionic acid by the action of sodium-ethyl upon carbonic acid,* which has just been communicated to the Chemical Society, proves the first proposition of a hypothesis, which considerably simplifies our views of the molecular structure of organic bodies, and which, if proved to be throughout correct, cannot fail to enable us greatly to increase the number of organic compounds capable of being procured from their elements without the intervention of vitality.

The speaker then referred to the following list of important organic bodies, selected from the large number above spoken of, as being capable of artificial formation from their elements:—

| Name. | Formula. |
|---|---|
| Oxalic Acid ........................ | $(C_2\,O_3,\,H\,O)_2$ |
| Hydrocyanic Acid .................. | $C_2\,N,\,H$ |
| Light Carburetted Hydrogen ... | $C_2\,H_4$ |
| Urea.................................... | $C_2\,N_2\,H_4\,O_2$ |
| Formic Acid (Acid of Ants)..... | $C_2\,H\,O_3,\,H\,O$ |
| Chloroform........................... | $C_2\,H\,Cl_3$ |
| Acetic Acid .......................... | $C_4\,H_3\,O_3,\,H\,O$ |
| Alcohol ............................... | $C_4\,H_5\,O,\,H\,O$ |
| Ether ................................. | $(C_4\,H_5\,O)_2$ |
| Olefiant Gas.......................... | $C_4\,H_4$ |
| Acetic Ether ........................ | $C_4\,H_5\,O,\,C_4\,H_3\,O_3$ |
| Oil of Garlic .................. ...... | $(C_6\,H_5\,S)_2$ |
| Oil of Mustard ..................... | $C_6\,H_5\,S,\,C_2\,N\,S$ |
| Glycerine ............................ | $C_6\,H_8\,O_6$ |
| Butyric Acid ........................ | $C_8\,H_7\,O_3,\,H\,O$ |
| Pine Apple flavour (Butyric Ether) ........................... | $C_8\,H_7\,O_3,\,C_4\,H_5\,O$ |
| Succinic Acid......................... | $C_8\,H_4\,O_6,\,2\,H\,O$ |
| Valerianic Acid...................... | $C_{10}H_9\,O_3,\,H\,O$ |
| Pear flavour (Acetate of Amyl).. | $C_4\,H_3\,O_3,\,C_{10}\,H_{11}\,O$ |
| Apple flavour (Valerianate of Amyl)........................... | $C_{10}\,H_9\,O_3,\,C_{10}\,H_{11}\,O$ |
| Lactic Acid........................... | $C_{12}\,H_{12}\,O_{12}$ |
| Grape Sugar?......................... | $C_{12}\,H_{12}\,O_{12}$ |
| Caproic Acid ........................ | $C_{12}\,H_{11}\,O_3\,H\,O$ |
| Benzole .............................. | $C_{12}\,H_6$ |
| Nitrobenzole ........................ | $C_{12}\,H_5\,N\,O_4$ |
| Aniline................................. | $N\,(C_{12}\,H_5)\,H_2$ |
| Phenyl Alcohol (Creosote) ...... | $C_{12}\,H_5\,O,\,H\,O$ |
| Picric Acid ........................... | $C_{12}\,H_2\,(N\,O_4)_3\,O,\,H\,O$ |
| Salicylic Acid........................ | $C_{14}\,H_5\,O_5,\,H\,O$ |
| Salicylate of Methyl (Oil of Wintergreen)........................ | $C_{14}\,H_5\,O_5,\,C_2\,H_3\,O$ |
| Naphthaline........................... | $C_{20}\,H_8$. |

The artificial formation of urea, lactic acid, and caproic acid, is interesting in connection with certain functions of the animal economy. Pine-apple oil, pear oil, and apple oil, are instances of the artificial production of the delicate flavours of fruit, whilst oil of wintergreen and nitrobenzole are like examples of the formation of esteemed perfumes. But of all the bodies hitherto thus produced, alcohol, glycerine, and sugar, are undoubtedly the most deeply interesting, owing to the part they take in the nutrition of animals: they prove to us the possibility of producing, without vegetation or any vital intervention, an important part of the food of man. Should the chemist also succeed in forming artificially the nitrogenous constituents of food, without which life cannot be maintained, it would then be possible for a man, placed upon a barren rock, and furnished with the necessary apparatus and inorganic materials, to support life entirely without either animal or vegetable food. No one of these nitrogenous constituents has, however, yet been artificially produced, and the absence of all clue to their rational constitution forms at present a formidable barrier to their non-vital formation.

It would be difficult to conclude a subject like the present without any notice of the considerations which naturally suggest themselves, regarding the possibility of economically replacing natural processes by artificial ones in the formation of organic compounds. At present the possibility of doing this only attains to probability in the case of rare and exceptional products of animal and vegetable life. Thus valerianic acid, which, for a long time, was extracted from the root of the *Valeriana officinalis*, could now probably be more cheaply prepared from its elements; but a still cheaper source of this acid has been in the meantime discovered, viz., the oxidation of amylic alcohol, a waste product formed in the manufacture of spirit of wine, and obtainable at such a moderate cost as to prevent, in an economical point of view, the successful production either of amylic alcohol or valerianic acid by any artificial and exclusively non-vital processes at present known. It is also highly probable, that if we could produce artificially such bodies as quinine and the rare alkaloids, or alizarine and similar powerful and valuable organic colouring matters, we should be able to compete with organic life in the formation of these bodies; nevertheless, the discovery of the processes of artificial formation would doubtless be preceded by a knowledge of methods by which such rare bodies could be produced from more abundant and consequently cheaper forms of vegetable or animal matter; and it is therefore exceedingly improbable that any purely non-vital process will be successfully, and at the same time economically, employed for the manufacture even of such rare and valuable vital products. Such being the economical bearings of the case with regard to the rare and exceptional educts of vitality, when we turn to consider the great staple products of the animal and vegetable kingdoms, the hope of rivalling natural processes becomes faint indeed. By no processes at present known could we produce sugar, glycerine, or alcohol from their elements at one hundred times their present cost, as obtained through the agency of vitality. But, although our present prospects of rival-

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*** This conversion of carbonic acid into propionic acid, was experimentally demonstrated, and the remarkable properties of sodium-ethyl and potassium-ethyl were also exhibited.**

ling vital processes in the economical production of staple organic compounds such as those constituting the food of man are so exceedingly slight, yet it would be rash to pronounce their ultimate realisation impossible. It must be remembered that this branch of chemistry is as yet in its merest infancy, and that it has hitherto attracted the attention of but few minds; and, further, that many analogous substitutions of artificial for natural processes have been achieved. Thus, under certain circumstances, we find it less economical to propel our ships by the force of the wind, and our carriages by animal power, than to employ steam power for these purposes. We do not find it desirable to wait for the bleaching of our calicoes by the sun's rays; and even the grinding of corn is no longer entirely confided to wind and water power.

In such cases, where contemporaneous natural agencies have been superseded, we have almost invariably drawn upon that grand store of force collected by the plants of bygone ages, and conserved in our coal fields. It is the solar heat of a past epoch that furnishes the power which we now utilise in our steam-engines. One important element in cheap production is time, and it is precisely in regard to this element, that we economically supersede, in the above instances, the contemporary resources of nature. Now time is also an important element in the natural production of food; and although it is true, that the amount of labour required for the production of a given weight of food is not considerable, yet it is nevertheless true that this weight requires a whole year for its production. By the vital process of producing food we can only have one harvest in each year. But if we were able to form that food from its elements without vital agency, there would be nothing to prevent us from obtaining a harvest every week; and thus we might, in the production of food, supersede the present vital agencies of nature, as we have already done in other cases, by laying under contribution the accumulated forces of past ages, which would thus enable us to obtain in a small manufactory, and in a few days, effects which can be realised from present natural agencies, only when they are exerted upon vast areas of land, and through considerable periods of time.

## BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The twenty-eighth annual session of the British Association commenced at Leeds, on Wednesday last.

The new Town-hall has been placed at the disposal of the Association.

The general committee assembled at one o'clock—the President (the Rev. Humphrey Lloyd, D.D.), in the chair. The following noblemen and gentlemen were also present:—Lord Goderich, Lord Monteagle, the Earl of Enniskillen, Lord Wrottesley, Sir Roderick Murchison, Professor Owen, Dr. Whewell, Dr. Latham, Sir B. Brodie, Col. Sykes, M.P., Mr. E. Baines, Sir John Rennie, Professor Faraday, Mr. Hopkins (Cambridge), Sir P. Egerton, Major-General Chesney, Dr. Gladstone, Mr. Monckton Milnes, M.P., Dr. Lee, Dr. Norton Shaw, &c.

The GENERAL SECRETARY (Major-General Sabine) read the report of the council, which, having referred to the unsuccessful exertions made by the Association to induce the late Government to send a vessel to the vicinity of Mackenzie's River, for the purpose of obtaining in that region certain observations which recent discoveries in terrestrial magnetism have proved to be of high importance to science, proceeded to state that the council had added to the list of corresponding members of the Association the names of the following foreign gentlemen, who were present at the Dublin meeting, and made communications to the sections, viz.:—Dr. Barth; Professor Bolzani, of Kazan; Antoine D'Abbadie, of Paris; Professor Loomis, of New York; Viscenza Pisani, of Florence; Gustava Plaar, of Strasburg; Herman Schlagintweit; and Robert Schlagintweit, of Berlin. With regard to the president of the Association for the year 1859-60, the general committee having resolved at the Dublin meeting last year to make application to his Royal Highness the Prince Consort for permission to elect him to that office, had received a reply intimating that his Royal Highness accepted the office, conditionally upon his being in Scotland at the time of the meeting.

The report was received and adopted.

The Parliamentary Committee reported that the late President of the Board of Trade, on a representation made to him by the association of the insufficiency of the accomodations and staff at the meteorological department at the Board of Trade, had consented to the appointment of two additional clerks and a working optician, to be permanently attached to that department; and, moreover, supplied more enlarged accommodations, so that, upon the whole, Admiral Fitzroy, who presided over this meteorological department, had expressed himself satisfied with the present arrangements and hopeful as to the future success of an Institution which could not fail to be productive of vast benefit to science.

The association expressed its extreme regret that the application to the Government to send the expedition to the Mackenzie River was unsuccessful; but they anticipated an important accession to our scientific knowledge from the expedition to the Zambesi River, which was sanctioned and sent out under Dr. Livingstone. That expedition had been well supplied with the necessary instruments, properly tested at Kew, and comprised those who were fully competent to use them.

The appointment of the Right Hon. Joseph Napier to the office of Lord Chancellor of Ireland had caused another vacancy in the Parliamentary Committee. There are now, therefore, two vacancies, one of which they recommended should be supplied by the election of the Right Hon. Sir John Pakington, First Lord of the Admiralty. The committee, referring to the proposed severance from the British Museum of the natural history collections, expressed their strong disapprobation of such a course, observing that "they knew of no measure which might be adopted by the Government or Legislature which would inflict a deeper injury on science than the removal of those collections, if unhappily carried out."

The first general meeting of the association took place in the evening, at eight o'clock, when the Rev. Dr. Lloyd resigned the chair, and the new president (Professor Owen) delivered the inaugural address.

The following is a list of the different sections as at present arranged:—

A.—MATHEMATICAL AND PHYSICAL SCIENCE.—President: The Rev. W. Whewell, D.D., F.R.S., &c.

B.—CHEMICAL SCIENCE.—President: Sir John Herschel, Bart., D.C.L., F.R.S.

C.—GEOLOGY.—President: Mr. Wm. Hopkins, LL.D., F.R.S.

D.—ZOOLOGY AND BOTANY, INCLUDING PHYSIOLOGY.—President: Mr. Charles Darwin, F.R.S.

E.—GEOGRAPHY AND ETHNOLOGY.—President: Sir R. I. Murchison, D.C.L., F.R.S.

F.—ECONOMIC SCIENCE AND STATISTICS.—President: Mr. Edward Baines.

G.—MECHANICAL SCIENCE.—President: Mr. W. Fairbairn, F.R.S.

## NATIONAL ASSOCIATION FOR THE PROMOTION OF SOCIAL SCIENCE.

The second annual meeting of this Association will be held at Liverpool on Monday, the 11th of October, and five following days. The local office and reception-room will be at St. George's Hall, Liverpool. The following prospectus, containing the order of proceedings and regulations for the meeting, has just been issued:—

## I.—Order of Proceedings.

### Monday, October 11.

Half-past One, p.m.—Meeting of the Council in the Library, St. George's Hall.

Half-past Three, p.m.—Special Service in St. Nicholas's Church. The Prayers will be read by the Rev. the Rector of Liverpool, and the Sermon will be preached by the Right Rev. the Lord Bishop of Chester.

Half-past Seven, p.m.—General Meeting in St. George's Hall. The opening address will be delivered by the Right Hon. Lord John Russell, M.P., and resolutions will be moved. Lord Brougham, the Earl of Shaftesbgry, and other leading members of the Association, will take part in the proceedings. Seats will be reserved for Members and Associates. The public will be admitted at two shillings and sixpence to the body, and one shilling to the galleries, of the hall.

### Tuesday, October 12.

Half-past Ten, a.m.—The Lord Chancellor of Ireland, the Right Hon. W. F. Cowper, M.P., and the Right Hon. the Earl of Carlisle, K.G., Presidents of the first, second, and third Departments, will deliver Addresses to Members and Associates in the Concert-room, St. George's Hall.

One, p.m.—An excursion to the *Akbar* Reformatory Frigate. A steamer will leave the Great Landing Stage to convey the Members and Associates on board, returning at three o'clock.

Half-past Three, p.m.—The Right Hon. the Earl of Shaftesbury, and the Right Hon. Sir James Stephen, K.C.B., Presidents of the fourth and fifth Departments, will deliver Addresses to the Members and Associates in the Concert-room, St. George's Hall.

Seven, p.m., to Ten, p.m.—The Liverpool Academy, Old Post Office-place, Church-street, will open its Exhibition of Paintings to Members and Associates, who will be admitted on presenting their tickets.

Quarter to Eight, p.m.—The Philharmonic Society have invited one hundred and fifty of the Members and Associates of the Association (being non-residents in Liverpool) to the Concert in the Society's Hall in Hope-street. Tickets, which will be issued strictly according to priority of application, to be obtained at the Reception-room, St. George's Hall, on either the Monday or Tuesday of the meeting.

Half-past Nine, p.m.—The Mayor has invited the Members and Associates to a Soiree in the Town Hall. Tickets to be obtained in the Reception-room, St. George's Hall.

### Wednesday, October 13.

Half-past Ten, a.m., to Four, p.m.—The Departments will meet in their respective rooms in St. George's Hall. Papers and Discussions will be taken.

Eight, p.m.—The Authorities of the Queen's College, Mount-street, have invited Members and Associates to be present at an Address to be delivered by Lord Brougham. Tickets may be obtained at the Reception-room, St. George's-hall.

Seven, p.m., to Ten, p.m.—The Liverpool Society of Fine Arts, Queen's hall, Bold-street, will open its Exhibition of Paintings to Members and Associates, who will be admitted on presenting their tickets.

### Thursday, October 14.

Half-past Ten, a.m., to Four, p.m.—The departments will meet in their respective rooms in St. George's-hall. Papers and Discussions will be taken.

Seven, p.m.—The Right Hon. Lord John Russell, M.P., and other Members of the Association, will address a Meeting of the Working Classes. Further particulars will be announced.

Eight, p.m.—Soirée of Members and Associates at St. George's-hall.

### Friday, October 15.

Half-past Ten, a.m., to Four, p.m.—The departments will meet in their respective rooms in St. George's-hall. Papers and Discussions will be taken.

Six p.m.—A public dinner will take place at St. George's Hall, Lord Brougham in the chair. Tickets, gentlemen, 21s., ladies, 10s. 6d., may be obtained at the Reception-room, St. George's Hall, or from Mr. Lynn, Waterloo-hotel, on and after Monday, 4th October.

### Saturday, October 16.

Eleven, a.m.—Concluding meeting of Members and Associates in the Concert-room, St. George's Hall. Reports and resolutions.

On Wednesday, the 13th, the Jurisprudence Department will be occupied with a discussion on Bankruptcy Law Amendment, which will be supported by representatives from Chambers of Commerce, Trade Protection Societies, and other public bodies.

On Friday, the 15th, the Social Economy Department will be occupied with a discussion on Coinage, Weights, and Measures, which will be supported by the International Association.

A programme of the papers and other business will be issued daily during the meeting, at the Reception-room, St. George's Hall.

## II.—Regulations for Members and Associates.

Any person becomes a member on payment of one guinea as an annual, or of ten guineas as a life subscription. Every member receives a ticket, which admits to all the meetings of the Association, and is entitled to the Transactions free of charge.

Any person becomes an associate for a year on payment of ten shillings. Every Associate receives a ticket which admits to all the meetings of the Association.

The Council invite ladies to enrol themselves as members and associates.

A limited number of tickets, transferable, ten shillings each, will be issued on the application of members only, admitting ladies to reserved seats, at the opening address, on Monday evening, and to all the meetings of the Association during the week.

In the book which will be transmitted with the members' and associates' tickets, will be found a list of the principal hotels and the lodgings recommended by the Local Committee. Refreshments will be provided in the Hall.

Members and associates are requested to enter their names, permanent addresses, and, if non-resident in Liverpool, their temporary addresses during the meeting, in the book provided for that purpose at the Reception-room, St. George's Hall.

A post-office for the use of the members and associates will be open at St. George's Hall during the period of the meeting. Letters should be addressed, "National Association, St. George's Hall, Liverpool."

The tickets are now ready, and can be purchased from the Local Secretary, George Melly, Esq., 7, Water-street, or the Local Treasurer, Arch. Briggs, Esq., 7, Walmer-buildings, Water-street, from whom all information can be obtained.

## NORTHERN ASSOCIATION OF MECHANICS' INSTITUTES.

The annual conference of this Association was held at Alnwick, on Thursday, the 14th inst., under the presidency of Sir George Grey, M.P. There was a considerable gathering of delegates from all parts of the northern counties, among whom were Mr. Joseph Cowen, junr., of Stella-house, Mr. Ingham, M.P., Dr. Embleton, Beadnell; Mr. Tate, F.G.S., of Alnwick, and other friends of education. Mr. J. L. Thornton, the Secretary to the Association, read the report, which stated that the itinerating library had proved very successful throughout the rural districts; that there was an increase in the number of societies in connexion with the union; and that the council had arranged a plan for a concerted series of lectures during the season. After the reading of the report, an interesting discussion took place on the subject of classes, in which Mr. Ingham, M.P., Mr. Joseph Cowen, junr., Mr. Tate, and other delegates took part. Mr. Joseph Cowen, junr., gave an interesting account of the successful efforts of the Blaydon Institution to extend popular education among the pitmen, keelmen, and other workmen in that Tyneside village. He also said that at the meeting at Gateshead last year, a proposition was made, he thought by one of the delegates from Gateshead. that, as efficient teachers were not forthcoming at the village societies, some attempt ought to be made to have one teacher for the different societies in the neighbourhood of Newcastle; that he should visit them in turn; and that by the different societies paying him a reasonable remuneration for his services, it would be worth his while to devote his time to the institutions *seriatim*. The institution which he (Mr. Cowen) represented acceded to this proposition, but few societies felt disposed to take it up. His society, however, determined they would do something on their own responsibility; and at the commencement of last winter issued notices of the commencement of classes for instruction in geography, history, and drawing, and he was glad to say that their first meeting for the establishment of these classes was extremely successful. After a week or ten days they were unable to afford accommodation for the number of pupils who attended. They therefore took an old building, previously used as a chapel for Wesleyan Methodists, and converted it into an efficient schoolroom, and there, for five months of last winter, and for five days in the week, they taught regularly a night-school, with complete success. The only difficulty they had was to find accommodation for the number of pupils that attended. They had an average attendance of something like 100, and the results were most satisfactory. He was persuaded that if similar efforts were made in other places, similar results would spring from them. They had had at Blaydon also a very successful experiment in regard to amusements. It was found that lectures on mechanical and philosophical subjects were not successful—that the number attending them was not sufficient to adequately remunerate the lecturer or pay the necessary expenses. They therefore adopted the plan of having some music—vocal and instrumental—and of imparting useful instruction between the pieces. He was very glad to say that this also had been successful, and that during the last winter, for six months, they had, every alternate Saturday night, entertainments of this description, and the average attendance each night was 400 or 500. The amount of good, social, moral, and otherwise, thus done in the village was considerable, and they had determined to commence a similar scheme this winter.

After the adoption of the report, the election of the council, &c., the right hon. chairman distributed the prizes for the best essays, and the conference broke up, to meet at Newcastle next year.

At the dinner, which was held at the Turk's Head, in the afternoon,

Sir GEORGE GREY, in proposing the toast "Prosperity to the Northern Association of Literary and Mechanics' Institutions," said that he could not fail to mention it as a subject of congratulation—that in the age in which we lived it was useless and superfluous to dwell upon the advantages of the diffusion of education and of knowledge. The time was happily gone by when, to use the language of a great writer, "The arrogance of learning could condemn to ignorance the great body of the people." The time was happily gone by, too, when the fears or apprehensions of one class of society could stand in the way or raise a barrier against the enlightenment and education of the great body of another. It was now universally admitted that knowledge is a blessing; and the only question which was discussed, the only thing upon which debates and difference of opinion arose, was as to the best means of effecting an object the value of which all concurred in. He believed there was nothing more true than a sentence which he found in an appeal lately issued by the council of this association in behalf of their itinerating libraries, soliciting aid for the continuance and extension of them—namely, that it was in vain to expect any marked improvement in the moral and social condition of the people, without affording them the means of intellectual culture and relaxation. This association was doing its utmost to carry out this object; and, therefore, he thought, it was deserving the support, the cordial support, of all who were anxious to promote the best interests of their fellow-countrymen. He most cordially concurred in the view put forward in a passage which was read from the report, in which it was stated that the object was the withdrawing men from the tavern and the alehouse, which would be frequented, in his opinion, whatever prohibitory laws were passed, so long as the tavern and the alehouse were the only resource which the working man had where he found social relaxation and intercourse. The best way to counteract that evil influence which was so much deplored by all, but which he hoped was losing its weight and diminishing in this country, was by establishing something which would be attractive to the working man, and which, while it would amuse and interest him, would also elevate and improve him. He thought the best mode of proceeding was to establish a reading room wherever a reading room could be established, accessible to the working man, comfortably lighted, with a cheerful fire, and with other requisites which were necessary in order to make it attractive; and by so doing they offered him, as a reasonable being, as a being accountable not only to the laws of his country, but accountable to God, enjoyments and objects of interest which, when once appreciated, would withdraw him from those debasing pleasures in which so many, in the absence of other objects of interest, were disposed to indulge. Sir George Grey then proceeded to speak of the advantages of some of the other means which the association employed for effecting the same object,—its lectures, its itinerating libraries, its evening classes and schools, and especially its system of examinations and prizes, which stimulated rising genius, and which were sufficient to induce men to devote their minds and faculties to the attainment of high and useful ends. Returning to the subject of reading-rooms, he thought that a useful and judicious selection of books was most important. He did not mean, by a useful and judicious selection of books, that they should very carefully weed their libraries of everything which the fastidious might think ought not to be there. It was by no means necessary that this should be the mode of dealing with libraries. Let there be books of all kinds in these libraries, but let the selection be a wise and judicious selection, with a view to put in those libraries books which, while they attracted, would also deeply interest, and would excite men to higher motives of action, and would supply them with examples to guide them in their course, in whatever sphere of life they might be placed. Before, however, he adverted to the character of the books which he thought it very desirable should be in these libraries, he wished to say a word on what he saw adverted to in many of the reports with reference to newspapers. He found rather a regret expressed that newspapers formed the principal attraction in the reading-rooms. In some cases, even, it had been thought almost necessary to separate the newspapers from other books, and to have one apartment for the newspapers and another for books, because newspapers diverted people's attention from what was most useful and valuable. For his own part he thought that, looking to the character of the newspapers of the present day—looking at the variety of information which they contained—looking at the ability with which they were written—at their descriptions of facts occurring in all parts of the world, looking at the reviews of literary works which were found in them, even if newspapers were the only literary food presented in these reading-rooms, he would still advocate the reading-room being open, provided it was confined to newspapers, which it was evidently not desirable it should be; but he would not withdraw the newspapers from those reading-rooms, or attempt to divert men from the perusal of newspapers by excluding them from the room where other works were kept, because he believed that even from newspapers much valuable instruction and information might be gained, especially as they were conducted in the present day; and he would encourage newspapers of a good class, containing, as many now did—even including in that class many of those which were published at the cheap rate of a penny, the latest information and events occurring in Europe, in London, and other distant places on the evening before. These cheap papers were conducted with great ability, and even they would be an admirable substitute for the debasing pleasures—if pleasures they could be called, which were afforded by the tavern and the publichouse. He would for a moment advert to what he saw alluded to in the report,—viz., works of fiction. He saw that a prize was offered for the best essay upon the expediency of admitting or excluding works of fiction from those libraries which were connected with Mechanics' Institutes. No essay had as yet been produced on this subject, and he did not know what view might be taken of it hereafter. The report rather invited opinion on it, and expressed a hope that what had been matter of such difference of opinion, and which had unhappily given rise to some ill-feeling, might be set at rest by the free consideration of it. First of all, he thought it most unfair to authors of works of fiction to class them together as a whole, and to draw a broad line of distinction between works of fiction and those works which were not of fiction. Some works of fiction contained admirable morals; some contained instruction of the highest character, and in a form in which perhaps no other works could convey it; and he thought it would be most injurious to the interests of those connected with those reading-rooms if works of this kind were excluded. He should therefore tender his humble service to the council of this association, if they were called upon to lay down any rule on the subject, not to exclude all works of fiction, because they would thus exclude what was deeply interesting to the great body of readers who frequented reading-rooms, and which would also be calculated to convey to them the highest moral instruction. The wise rule would be to look to the character of the work from its intrinsic merits rather than to draw any arbitrary rule, which he was sure would be most injurious to the interests of those for whose benefit those institutions were intended, and would tend very much to defeat the object which those had in view who were zealous in the promotion of them. It was, however, a subject of great congratulation that we had a number of books published from time to time which were not ephemeral, which were not works of fiction, but which possessed as deep an interest as could be possessed by any works of fiction, while they were calculated in the highest degree to elevate the minds of them who read them. He would refer to some of those which had been published within the last year. He would instance the life of a man they might almost call their own—George Stephenson, a man of whom the North of England might justly be proud. Who was there that could read that "Life of George Stephenson"—looking at his early struggles for knowledge, unaided by any of those advantages which the Mechanics' Institutes in the present day afforded to men similarly circumstanced, labouring to make the best use of that intellect which God had implanted in him—labouring with a success which made him one of the first men in Europe—without feeling the deepest interest in the narrative, and without feeling himself a better man for an attentive perusal of that work? George Stephenson was a self-educated man, for while he laboured successfully against all disadvantages in cultivating that intellect with which God had endowed him, he did not overlook the immense advantages which the means of high education afford, but he gave his son—the present distinguished man who bore his name, and who also was one of the first men for engineering talent in Europe—gave him the best education which it was in his power to command, showing how much he appreciated those advantages which these institutions set before the mechanic, and how much he valued those means which were now placed within the reach of all for the improvement of their minds and for obtaining that knowledge which was conducive to the highest ends. He would turn from the life of George Stephenson to the life of a man who moved in a totally different sphere, and whom, he was also proud to say, they might claim for the North of England. Who was there who had read any of those short and very interesting memoirs that had lately been published of that great and lamented soldier, General Havelock, who did not feel the deepest interest, who did not acknowledge that there was the highest instruction to be obtained in the perusal of the life of such a man moving altogether in a different sphere, and setting an example which some of them from their different circumstances might think they might not be able to follow, but still acting from a motive which must and ought to influence all—the highest motive which ought to regulate the conduct of men? Then, again, who was there that had read the narrative of the heroic defence of the beleaguered city of Lucknow by the garrison, cut off as they were from all intercourse with their fellow-countrymen, that did not admire the spirit which animated them, and feel himself incited to the highest deeds by reading the matter-of-fact commemoration of their daily trials and their daily exertions? He would mention another book which had only been published very recently, since the last meeting of the association, and which would not, therefore, be generally known; viz.,—"English Hearts and English Hands," written by an English lady, and recording in the most simple terms her experience among a class of men whose rough exterior and demeanour repelled most men—the men employed in making railways—and showing that beneath that rough exterior there was a soil well worthy of cultivation—a generous and noble feeling, only requiring to be called out by kindly intercourse with one who had most nobly devoted herself to their welfare. This book spoke of Englishmen in a way that was of thrilling interest, and conveyed this important lesson, "Go thou and do likewise." They might not all be able to do what she did, but let every one be animated by the same excellent feeling towards their fellow-creatures as she was, and then there would not be wanting the means by which they might benefit those around them, whatever their sphere of influence might be. Sir George Grey then referred to a work by Hugh Miller, called "My Schools and Schoolmasters," which gave the early autobiography of that eminent man. That book was one which he had read with the greatest interest, and with feelings of humiliation to think that with all the advantages one had possessed, one fell so far short of what he attained—unaided as he was by those advantages which others more favourably circumstanced had enjoyed. He had ventured to allude to those books rather as types of a class of works which, if placed in these libraries, could not fail, he thought—in connexion, let it be, with works of another kind, with newspapers and the best works of fiction—to attract and interest. People would not read because they were told to read, and because they were told a book was a good book; but if they found a book full of deep interest, full of narrative and facts, and all the more interesting because they were facts, that was the way in which, he was sure, they would get those reading-rooms frequented. They should attract people to them, and thereby carry on a successful competition against the tavern, the alehouse, and the beershop. In connexion with these reading-rooms he certainly thought it was most important that means should be found for extending the itinerating libraries. There was a great advantage in having a change of books, and if these itinerating libraries—such libraries, he presumed, not always being of the same kind, but varying in the character and description of the books—if these itinerating libraries were sent about to remote villages and hamlets, and were there detained for three months, and then changed for others, the interest, which otherwise would flag, would be kept up. He would now for a moment advert to lectures. He thought that, however good lectures might be, they were not a substitute for reading or a substitute for books, but should only be regarded as a most useful auxiliary. The great object of the lecture was, in his opinion, to lead people to books, not to let them go away satisfied that they had got from the lecture what no lecturer would ever think or dream himself capable of giving them, a thorough knowledge of the subject on which the lecture was given; the great object of the lecture ought to be to excite an interest, to stir up the mind, and to excite that curiosity which was implanted in every man, and which only wanted a right direction. If lectures were so understood, if they were intended to stir up a spirit and taste for reading, then he thought they were in a proper place, and could not be too highly commended. Books, however, it had been observed by M. Guizot, in a recent work of his, in a sentence which was worth remembering, "Books are the tribune from which the world is addressed." Lecturers could only address the few present, confined within the walls in which they lectured, but books circulated among thousands. He therefore, still without undervaluing the advantages of those lectures, attached the greatest importance to the reading-room, to a well-selected library, and to the itinerating libraries. He would just advert to allusions which had been made, towards the conclusion of the report, to the complaint which had been put forward by some, that these Mechanics' Institutions had been failures. In one respect, and to a limited extent, they certainly had not answered the reasonable expectations of those by whom they were first advocated, and by whom they had been supported. There had certainly been an amount of apathy which was hardly expected among the great body of the working-people. They had not shown that interest in Mechanics' Institutions—that desire to avail themselves of their benefits, to the extent that had been hoped and expected would have been the case. At the same time, their growing influence showed that there was an increased appreciation of their benefits among the working classes generally. The friends of education should not be discouraged. Let them do as had been done at that meeting, let every man bring his own suggestions and his own experience into the common fund; and if they found that the result which they anticipated had not been attained to the fullest extent, let them consider whether it was not partly their own fault, and whether they were using the right means,—whether there was not something also which they could do which would tend to remove those obstacles which might have unhappily stood in the way of the complete success of these Institutions. A complaint was sometimes made that the knowledge obtained in them was all superficial, and would do very little good. He would mention the way in which one of the deepest thinkers, perhaps, of modern times, the late Sir James Mackintosh, combatted this objection. Though there was hardly any deeper thinker and better informed man than he, yet he ventured to become the advocate of superficial knowledge—not of superficial knowledge as against knowledge of a deeper kind, but superficial knowledge in those who had to choose between what might be termed superficial knowledge and ignorance. The great body of the people could not be profound, but, at the same time, the great truths which regulated the moral and political relations of men lay not very far below the surface, and it did not require that a man should be a philosopher, that he should go deep into the arcana of science, in order to apprehend those great moral and political truths. Sir James Mackintosh went on to say that the great works in which scientific discoveries were made, and scientific truths stated, were only read by a few; but that the truths which these works contained, pervaded gradually the minds of a reading people—even though that reading might be of a kind that was almost superficial, and, by a variety of almost unseen and circuitous channels, they penetrated everywhere, even to every shop and every hamlet. Let them not, therefore, be discouraged by thinking that all knowledge which by wise men, or rather by very learned men, might be termed superficial, was useless; and let no man abstain from entering upon the path of knowledge, and endeavouring to lead others to do the same, because they might not attain those heights which they might desire, but which circumstances placed beyond their reach. In conclusion, Sir George Grey alluded to the prospect of Examinations being held by the authorities of the University of Cambridge at Newcastle, and dwelt upon the advantages that these and similar Examinations afforded as an encouragement to persevering exertion.

## MANUFACTURE FROM THE WASTE OF WOOLLEN MILLS.

A process was recently set in operation at the Kingholm woollen mills, in the neighbourhood of Dumfries, by which the hitherto refuse of the washing houses is converted into valuable commercial material, in place of being turned into the river Nith and adding to the pollution of its waters; and this process exhibits one of the most pleasing and interesting examples of the economical power of chemical science which has yet been seen.

In a woollen manufactory the first thing done is to wash the wool thoroughly. The same thing is done frequently when the wool has been spun into yarn, and always when the yarn has been woven into cloth. Wool in its natural state contains a considerable quantity of grease or animal oil; and it is besides oiled to enable the spinning process go on properly. Again the soap, which with a little soda forms the only washing materials used at Kingholm besides water, contains a considerable proportion of oil; so that it may be readily seen that the refuse water from the wash-houses is rich in animal matter. To turn this to account an apparatus has been erected at Kingholm, which we will endeavour to describe.

Iron pipes have been laid from each of the washing machines to a tank placed at one side of the wash-house, and the mouth of the pipe which runs from the machines washing wool is covered with perforated zinc plate to prevent any loss of raw material. A small force-pump, driven by the mill engine, lifts up the water collected from the various machines in the tank, and sends it through another series of pipes to a building which has been erected outside the mill and close to the boiler-shed, which at Kingholm is without the mill. The waste water flows into three elevated tanks in the building, which it enters at a temperature of about 120°. Each tank is provided with a small steam pipe from the boiler, and a jet of steam is occasionally introduced so as to bring the soap suds up to the temperature of 160°. When as much washing has been done as to supply sufficient suds to fill one of the tanks, and a proper temperature has been gained, a chemical preparation is poured into the tank, which acts with power upon its contents. The water, before being acted upon, is of a dirty white colour, and about the consistency of cream; gradually, after the acids and other substances have been introduced, a viscid scum rises to the top, while a quantity of matter is precipitated to the bottom of the tank, which it covers till about a foot in depth; both the floating and precipitated substances are chemically the same, but the latter sinks, owing to the sand and other impurities with which the suds are mingled. Betwixt the upper and lower layers of matter, after chemical action has ceased, is a mass of water nearly pure, the discoloration being very slight indeed, free from smell, and, we believe, slightly salt to the taste. By a very ingenious application this water is run off, and the scum which had floated upon it sinks down and is mingled with the precipitated matter. In the centre of the bottom of the tank there is an iron pipe, which leads to the sewer, and to this is jointed another iron pipe, the height of which is nearly equal to the depth of the tank. The pipe usually stands upright, and when the water is ready for being run off, the pipe is lowered so that its mouth is brought down to the top of the precipitate, by which means nothing but the clear water escapes. When this water has been discharged from the tank, the viscid mass remaining, which in consistency resembles slaked lime, is run through openings in the tank down to a series of bags of matting suspended upon trestles; here it remains for some hours until the water taken up has been drained away; and then a couple of spadefuls are enveloped in a canvas cloth; spadeful after spadeful is thus wrapped up and laid upon a wooden bed for further drying. When that has been sufficiently done, the cloths and their contents are subjected to pressure at a high temperature. The press consists of a square iron box and a screw worked by a fly-wheel; the cloths are laid upon iron plates until the press is full; steam is then admitted, and the screw applied, when slowly but steadily a stream of oily fluid is squeezed out into a small tank, leaving nothing within the press but layers of a substance resembling oil-cake in appearance. The oily matter is transferred to a large barrel, in which it is clarified by a chemical agent and the admission of a small quantity of steam. It soon becomes solid and fit for transport to the works of Messrs. Saundars and Smith, of Manchester, the patentees of this interesting process, where the reclaimed substance is bleached and otherwise treated, the principal product being stearine, which forms the basis of composite candles. The cake is used as a manure, and will be sold on the premises at Kingholm at 40s. per ton.

The process now described is already in general use in the seats of the woollen manufacture in England, and is being extended to Scotland. Already about 30 tons of the oily matter, yielding stearine and other substances, are weekly collected in England, and it is expected that 20 tons will be gathered every seven days from the manufacturers north of the Tweed.

The patentees are at the exclusive cost of erecting the whole of the apparatus, and pay the manufacturer a percentage for the use of his soap-suds, according to the amount annually expended in each mill on soap and oil. In extensive manufactories this amounts to a very handsome sum; while the millowner in pocketing this has at the same time the satisfaction of knowing that he sends into the stream which sweeps past his works a volume of comparatively pure water, instead of a turbid flood, not only dirty in itself, but poisoning sweet waters and injurious to fish.

There is another advantage connected with this admirable invention. From the rapidity with which the process is conducted, what are soap-suds one day becoming solid oil the next, there is no time afforded for decomposition, and the process is conducted without offensive smell, or being in any way a nuisance. Even the refuse from the extensive mills at Kingholm is turned to account by the labour of a single man in charge of the apparatus. There are three tanks in the building and one screw press, but a second press will be required to carry on the work properly.

Here, then, we have a valuable commercial product from which especially a pleasant light in the long winter evenings is obtained; an additional amount of artificial manure, for which every distant land is ransacked, procured at the farmer's door; the manufacturer of our Tweeds benefited as well as the owner of the apparatus; additional employment given both directly and indirectly; a step made in the purification of rivers and streams; all these procured from what was a waste and a nuisance—beneficial results of one application of chemical and mechanical science. Surely when this has been so thoroughly done, we may indulge the hope that the same sciences will ere long master the difficulties of the sewage question, and that our towns will be rendered healthful, our rivers purified, and our lands enriched by some process analogous to that which extracts good candles and manure from the hitherto wasted and despised soap-suds.—*Dumfries Courier.*

## STAFFORDSHIRE BOOT TRADE.

It is stated that for some time past the manufacture of boot tops by machinery has caused considerable alarm to the workpeople, especially in Stafford, where most of the population are engaged in the boot and shoe trade, and where, as yet, no machine has been introduced. A short time since Messrs. Springthorpe and Newell, shoe manufacturers, called their hands together, and stated their intention of using the machine, and issuing machine-bound tops for them to make up. To consider the question a meeting of the trade societies has been held, at which it was decided to resist the introduction of machine-bound tops, and to guarantee aid to all who refused to make up such goods. Another and larger meeting of makers and binders (unconnected with trade societies) was convened by the public crier, and about 2,000 persons, of both sexes, assembled in the new covered market. Mr. Newell addressed this meeting, urging that it was useless to oppose the progress of machinery, and that opposition, if persisted in, would injure the trade of the town, as purchasers would go to those markets where they could buy the cheapest and best article. He admitted that the binders would be thrown out of work, but said that hands would be needed to manage the machines, and that more work would be provided for the makers. Several workmen, on the other hand, said the use of the machines would throw out of employ their wives and children, and entail poverty and destitution on many homes. A resolution, pledging those present not to make up any machine-bound tops, was passed by acclamation, and without a dissentient hand.

## PEAT GAS.

It is stated in the *Dublin Freeman* that a village has recently been successfully lighted by gas made from bog peat. More than a year ago John Wilson, Esq., J.P., Daramona, Westmeath, had gas works erected at his private residence to light up that building, the out-offices, farm-yards, &c. Since that time he has used no other kind of artificial light than what was made from the turf of his locality. Within the last four months Mr. Wilson arranged with Mr. Johnson, the patentee of the process employed, for the erection of a second and more extensive apparatus, in order to light with turf gas a village on his property. The gas produced gives a pure and brilliant light. The enthusiasm of the people who had assembled to see the ceremony of first lighting the gas became loudly enthusiastic—cheers and every possible demonstration of gladness were vented at the success of the undertaking, and the indelible proof given of the fact that there is something in the bogs of Ireland.

## SOUTH KENSINGTON MUSEUM.

During the week ending 18th Sept., 1858, the visitors have been as follows:—On Monday, Tuesday, and Saturday (free days), 3,783; on Monday and Tuesday (free evenings), 5,479. On the three Students' days (admission to the public 6d.), 615; one Students' evening, Wednesday, 127. Total, 10,004. From the opening of the Museum, 602,151.

# Home Correspondence.

## EXHIBITION OF 1861.

SIR,—On Mr. Winkworth's letter on the site of the proposed Exhibition of 1861, I wish to offer a few remarks. He completely ignores that the West-end Railway at Battersea will, before that year, be carried across the Thames to a terminus at Pimlico, within a quarter of a mile of Buckingham Palace, a spot easily reached by all the north-western suburbs. There is no reason why omnibuses should not be established to this new terminus, or to Battersea-park at cheap rates, as they were in 1851 to Hyde-park. Omnibus proprietors and cabmen are fully awake to their interest, and would not fail to profit by the stream of visitors that would be drawn to the Exhibition of 1861, wherever it may be established. If they are now wanting at Battersea terminus, Mr. Winkworth gives an excellent reason for it, by acknowledging the paucity of travellers to this terminus at present. There are vast populations in the eastern district of London, besides the mass of inhabitants on the south side of the Thames, and where steam-boat communication would save the nuisance and delay of threading through the crowded streets of London to Hyde-park. The recollection of 1851 must have proved to the visitors the confusion at times of having only one road to the Exhibition building, whereas Battersea-park will enjoy the advantages of the two rails thither; one from London Bridge, Surrey-side, and one from the new terminus at Pimlico, besides the river steam-boats. On the score of dampness, Mr. Winkworth confesses himself uncertain; surely that could be overcome, if it exists at all, by the scientific construction of the building, which, be it remembered, is intended solely for an Exhibition during the summer months. I am, &c.,

HENRY MOGFORD.

SIR,—I agree with Mr. Winkworth in thinking that the immediate neighbourhood of the old Exhibition of 1851 is the best site for the Exhibition of 1861. Mr. Winkworth has assigned good and valid reasons in favour of South Kensington. The truth, in my opinion, is that the advocates of Battersea-fields forget the great North of England population, and they further forget that the London and North-Western Railway Company has now one of their private stations for materials within half a mile of the Commissioners' land; and I cannot doubt that before 1861 the directors of that company will, with their usual forethought, make it a line for passenger traffic, thus enabling them to deliver, almost on the very spot of the Exhibition of 1861, exhibitors, goods for exhibition, and visitors from the entire North of England and North-east of London.—Yours, &c.,

A WELL-WISHER TO EXHIBITIONS.

# Proceedings of Institutions.

GREENWICH.—J. Angerstein, Esq., of the Woodlands, Blackheath, has forwarded to Mr. Cobbett, of Deptford-bridge, the munificent donation of £100, to be expended by him on books for the library of Greenwich Literary Institution, which already consists of between 3,000 and 4,000 volumes. The members of the institution number nearly 1,000.

LONDON MECHANICS' INSTITUTE.—On Wednesday, the 16th inst., the certificates of the Society of Arts, obtained at the late examination by members of the London Mechanics' Institute, were publicly presented to the successful candidates, by Mr. T. A. Reed, Chairman of the Local Board of Examiners. Having given a brief explanation of the manner in which the preliminary and final examinations were conducted, Mr. Reed stated that nine members of the Institution presented themselves for examination by the Local Board, together with three members of other Institutions not having Local Boards of their own. Of these twelve, eight (all members of the London Mechanics' Institution) successfully passed the preliminary ordeal; but six only were able to present themselves for the final examination, one of the candidates having been prevented by illness, and another being a few weeks under the prescribed age. Of the six who were examined, one only was unsuccessful, and the remaining five obtained between them eleven certificates. This result was highly creditable to the candidates themselves and to the Institution in connection with which they had obtained these honourable proofs of their efficiency. It showed that the pulse of the old Institution was still throbbing; that, despite sinister forebodings out of doors, the time had *not* arrived when they were called upon to write its elegy and wish peace to its ashes. The result of the examination, he trusted, would have the effect of increasing the attachment of the successful candidates to the Institution, and operate as a stimulus to their fellow members to prosecute their studies with the like diligence, that on some future occasion they might meet with the like success. Not, however, that success was an accurate criterion of the value of the examinations; for it was obvious that the course of discipline which a candidate would pass through in order to prepare himself for the ordeal could not be otherwise than beneficial, whatever might be the result of the examination itself. Mr. Reed then intimated that the prize obtained by the Local Board for having sent up so large a proportion of successful candidates would be expended in books to be offered as prizes to some of the elementary classes of the Institute. The following certificates were then presented:—

*Arithmetic.*—Mr. James Dickie, Second-class Certificate (Proficiency).

*Algebra.*—Mr. Daniel Leggatt, Second-class Certificate (Proficiency).

*Bookkeeping.*—Mr. James Dickie, First-class Certificate (Excellence). Mr. William W. Snelling, First-class Certificate (Excellence).

*Chemistry.*—Mr. Thomas Shinn, Second-class Certificate (Proficiency).

*Descriptive Geography.*—Mr. James Dickie, First-class Certificate (Excellence). Mr. William W. Snelling, First-class Certificate (Excellence).

*English Literature.*—Mr. Francis Lynch, Second-class Certificate (Proficiency).

*French.*—Mr. James Dickie, Second-class Certificate (Proficiency). Mr. Francis Lynch, Third-class Certificate (Competency).

*Latin Language.*—Mr. Francis Lynch, Third-class Certificate (Competency).

## PATENT LAW AMENDMENT ACT.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[*From Gazette, Sept.* 17, 1858.]

*Dated 4th August*, 1858.

**1774. J. B. Pascoe and J. R. Thomas, Chacewater, Cornwall—An improved method of and apparatus for feeding boilers of all steam engines with liquid, without the aid of the force pump heretofore used.**

*Dated 6th August*, 1858.

1790. C. Barthémely, 27, Bush-lane, London—Certain imp. in hats.

*Dated 10th August*, 1858.

1829. R. H. Collyer, M.D. and C.E., 3, Park road, Regent's-park—An improved coating composition to protect vessels from marine animal and vegetable substances.

*Dated 11th August*, 1858.

1821. J. T. Pitman, 67, Gracechurch-street—An improved mode of operating apparatus for lifting and pressing. (A com.)

*Dated 20th August*, 1858.

1900. A. Baker, 6, Lambeth-road, Southwark—An improved method of and apparatus for submerging or laying under water electric cables, wires, or lines, and for the recovery thereof.

*Dated 28th August*, 1858.

1950. J. Ireland, Manchester—Imp. in cupola furnaces.

1952. W. Foster, Black Dike Mills, near Bradford—Imp. in the manufacture or production of fabrics known as fancy moreens.

1954. J. D. Brabazon, Lane's Hotel, St. Alban's place, Haymarket—Imp. in giving motion by sails to screw and other propellers of ships and vessels.

*Dated 30th August*, 1858.

1958. E. Massey, Tysoe-street, Clerkenwell—Imp. in ship's logs.

1960. G. Davies, 1, Serle-street, Lincoln's-inn—Imp. in billiard-tables and cues. (A com.)

1964. G. Jones, Bangor Wharf, Pimlico—Securing joints in slate ridge roll.

1966. E. Lindner, New York—Imp. in breech-loading fire-arms and ordnance, and in cartridges.

1968. T. R. Harding, Leeds—Imp. in the method of making straight or circular combs for flax, wool, or silk machinery.

*Dated 31st August*, 1858.

1970. E. Spary, Queen's Graperies, Park-street, Brighton—Imp. in fumigators.

1972. M. A. F. Mennons, 39, Rue de l'Echiquier, Paris—Improved apparatus for the elevation of liquids. (A com.)

1974. F. Ayckbourn, Lyon's-inn, Strand—Imp. in the construction of beds and other articles for sitting or reclining upon.

1976. D. Heyworth, Featherstall Mill, Littleborough, Lancashire, and J. Heyworth, Prospect Mill, Hebden-bridge, Yorkshire—Certain imp. in looms for weaving.

1978. A. V. Newton, 66. Chancery-lane—An imp. in gas burners. (A com.)

1979. W. Rose, Hales Owen, Worcestershire—An imp. or imps. in piling or combining metals to be used in the manufacture of arms and cutlery, and for other similar purposes.

1980. A. V. Newton, 66, Chancery-lane—Imp. in air engines. (A com.)

1981. Capt. P. D. Margesson, Woolwich—Imp. in treating sugar canes and other canes containing saccharine matter in the preparation of food for animals, also in manufacturing sugar, and worts, or wash, for brewing, distilling, and vinegar making, and in applying the resulting fibre in the manufacture of paper.

*Dated 1st September*, 1858.

1982. W. Pursall, 22, Whittall-street, Birmingham—Imp. in the manufacture of percussion caps.

1983. W. Phelps, Red Lion-square—Imp. in wet gas meters. (A com.)

1984. W. Hobbs, 196, Piccadilly—Imp. in ordnance and warlike projectiles to be used therewith.

1985. J. Sloper, 215, Oxford-street—Improved means of and apparatus for indelibly crossing or marking bankers' cheques, drafts, documents, or other things, with a view of preventing erasures or fraudulent dealings therewith.

1986. H. C. Jennings, 8, Great Tower-street—Imp. in the manufacture of artificial parchment, and converting the same into leather.

1987. W. Warne, Tottenham—Imp. in the construction of elastic pavements and linings for walls, and in the manufacture of elastic mats, brushes, and pads for packing furniture.

1989. W. E. Newton, 66, Chancery lane—Imp. in the construction of locks for doors, safes, and other purposes. (A com.)

1990. W. E. Newton, 66, Chancery-lane—Imp. in springs for carriages and other purposes. (A com.)

1991. S. Laing, Mill Wall—Imp. in the apparatus employed in the manufacture of gas.

*Dated 2nd September*, 1858.

1992. J. Walker and J. Barnes, Oakenshaw, Lancashire—Imp. in blankets and lappings for machine and block printing and other similar purposes.

1993. G. Price and W. Dawes, Wolverhampton—Imp. in steam-engines, steam boilers, and apparatus connected therewith.

1995. J. T. Pitman, 67, Gracechurch-street—An imp. or imps. in the construction of pneumatic condensing apparatus, for the purpose of compressing air, aeriform or gaseous bodies, preparatory to their use as prime motors, or for other purposes. (A com.)

1996. B. Winstone, 100, Shoe lane—An imp. in the composition of copying and writing inks.

*Dated 3rd September*, 1858.

1907. J. M. Bellanger, 41, Rue de Trévise, Paris—Caoutchouc socks or clogs, with springs and without bridles.

1998. J. Robertson, Glasgow—Imp. in driving belts and springs.

1999. W. Harkes, Lostock Gralam, Cheshire—An improved plough and pulverizer.

2000. E. Cocker, Newton Heath, near Manchester—Imp. or imps. in machinery for spinning, twisting, or doubling cotton, flax, silk, wool, or other fibrous materials.

2001. G. T. Bousfield, Loughborough-park, Brixton—Imp. in knitting machinery. (A com.)

2002. R. A. Brooman, 166, Fleet-street—An improved apparatus for supporting the skirts of ladies' dresses. (A com.)

*Dated 4th September*, 1858.

2003. A. Guye, Clerkenwell—Imp. in the escapements of chronometers and watches.

2004. R. P. Lavie, Paris—Imp. in mills.

2005. R. A. Brooman, 166, Fleet-street—Improved apparatuses for receiving, containing, and delivering liquids. (A com.)

2006. W. H. Child, Providence-row, Middlesex—Imp. in hair and skin brushes.

2007. W. P. Piggott, 16, Argyle-street, Regent-street, and S. Beardmore, 37, Upper Berkeley-street—Imp. in vinous and fermented liquors.

2009. A. V. Newton, 66, Chancery-lane—An imp. in firearms. (A com.)

2010. H. Hyde, Truro, Nova Scotia—Imp. in the construction of carriage-springs. (A com.)

2011. A. Hills, Blackheath, Kent—A method or methods for the better securing the integrity or genuineness of bankers cheques or orders for money.

*Dated 6th September*, 1858.

2013. S. Hoga, 14, Nassau-street, Middlesex-hospital, W. P. Piggott, 16, Argyle-street, Regent-street, and S. Beardmore, Upper Berkeley-street—Imp. in submarine electric telegraphs.

2015. J. Ramsbottom, Accrington, and T. Watson, Baxenden, Lancashire—Imp. in machinery or apparatus for weaving.

2017. H. J. Distin, 9, Great Newport-street, Leicester-square—Imp. in cornets and other musical wind instruments.

*Dated 7th September*, 1858.

2019. W. S. Champness, 10, Osborne-terrace, Clapham-road, Surrey—Imp. in syringes for male and female use.

2021. E. Fullwood, Queen-square, Bristol—Imp. in the manufacture of cements.

INVENTIONS WITH COMPLETE SPECIFICATION FILED.

2083. J. Luis, 1B, Welbeck-street, Cavendish-square—A new system of moulding without foundry pattern. (A com.)—14th September.

## WEEKLY LIST OF PATENTS SEALED.

*September 17th.*

538. W. S. Clark.
541. W. Todd and J. Todd.
547. R. A. Brooman.
550. L. E. Fletcher.
555. A. Dunlop and A. Stark.
556. T. Suffield.
563. P. F. Aerts.
564. H. Brocklebank.
565. G. Scott.
573. J. Young.
574. J. Bramwell.
581. R. Mills.
585. J. Le Franc.
588. J. T Pitman.
592. J. Thomas.
597. I. Holden and E. Hubner.
615. C. Chevallier, M. I. Olivier, and E. Rolland.
620. G. A. Biddell and W. Balk.
626. D. A. Hopkins.
628. J. Nuttall.
632. F. Foucou.
652. W. T. Eley.
658. W. Garnett, C. Geldard, and J. Dugdale.
662. J. Horton.
680. J. Musgrave.
698. W. E. Newton,
706. A. Pelez.
800. W. E. Newton.
832. J. Luis.
964. B. L. A. Peaucellier.
965. E. T. Hughes.
1416. C. Vero and J. Everitt.
1420. Sir J. Paxton, M.P.
1452. J. Luis.
1528. J. D. Weston.
1562. M. A. F. Mennons.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

*September 13th.*

2070. J. H. Tuck.
2086. W. Sangster.
2091. J. Gray.

*September 14th.*

2088. D. Zenner.
2089. L. D. B. Gordon.

*September 16th.*

2102. R. A. Brooman.

*September 17th.*

2106. R. A. Brooman.
2113. G. A. Biddell.
2168. J. Good.

*September 18th.*

2119. J. Page and W. Robertson.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| No. in the Register. | Date of Registration. | Title. | Proprietors' Name. | Address |
|---|---|---|---|---|
| 4118 | Sept. 15. | Improved Hall Lamp | T. Patstone | 8, Icknield-square, Monument-lane, Birmingham. |
| 4119 | „ 20. | Root Slicer and Cutter | S. Robb and J. Waudly | Oatwell, Cambridgeshire. |